

EPA, DTSC, and CDPH reviews of the Navy's Draft
Parcel C Radiological Data Evaluation Findings Report Draft
Hunters Point Naval Shipyard, San Francisco, California

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Below is an explanation of the contents of the individual spreadsheets in this workbook

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Summary of recommendations for individual trench units

IPA reviews of Parcel C Trench units that the Navy did not already recommend for re-sampling or reanalysis of archived samples in the October 2021 Draft Radiological Data Evaluation Findings Report																
Trench Unit	Overall Score (0-2)	Box Plots	Q-Q Plots	Rounds of excavation	Gamma scan static concerns	On or off site lab	Time Series	Suspect name (Lynch, Onco)	Name, if suspect	Name, if not suspect	Signs of falsification (Lynch, Onco)	Signs of falsification summary	Failure to follow variation (Lynch, Onco)	Signs of failure to follow workplan	Comments - Other	Follow-up needed, e.g. questions for Navy
TU193	2	1) Data Evaluation form did not include graphs for Cs-137, however box plot generated by PIVOTs for the Frenchess show Cs-137 results at low, with multiple negative results - indicating a data quality issue. 2) Bi-214 data has low variability	1) Ac-228 and K-40 have elevated results indicating multiple populations. 2) Ac-228 and K-40 have low variability	1	1) Gamma static and scan results are not consistent; static data (4335-4546 cpm) is less variable and inconsistent with scan data (2890-7700 cpm)	Consistent	1) Characterization results were highly variable for Ac-228 and Bi-214 but FSS results were not variable even though no excavation was performed at these trenches.	1	J. Cunningham	N/A	1	1) Characterization results were highly variable for Ac-228 and Bi-214 but FSS results were not variable even though no excavation was performed at these trenches. 2) K-40 had highly elevated results for 4-40 in two samples in the FSS despite the fact that the HDS in these same two samples did not vary and were consistent with all other samples. 3) Q-Q Plots for FSS results for K-40 object at least two different data distributions	1	1) Gamma static and scan date and time were not provided in the SUPR	1) TU contained sewer line that was connected to or downstream from radiologically impacted Building 241	
TU199	2	1) Significant variability in characterization, bias and FSS results for 41 radionuclides, especially Ac-228, Bi-214	Slope breaks on Bi-214 and K-40 plots indicate multiple populations.	2	1) Gamma static data had low variability (4,690-4,930 cpm) and was not consistent with scan data (2,540-7,210 cpm)	Data is consistent with the exception of sample 25 where Bi-214 and K-40 were reported as low values for on-site lab, but at much higher levels at off-site lab.	1) Variability noted in bias, characterization and FSS results for all radi.	1	R. Roberson	N/A	1	1) Bi-214 (0.023 pCi/g) and K-40 (0.153 pCi/g) were reported at levels much lower in on-site lab than reported in off-site lab. 2) K-5 test outliers for Pb-213. Gamma static data had extremely low variability (530 cpm), suggesting data was collected in one place	0	1) Gamma static and scan date and time were not provided in the SUPR	Resample due to extremely low variability gamma static data that was inconsistent with the gamma scan data and the FSS dataset, and evidence for multiple populations in K-40 and Bi-214 data sets.	
TU200	2	1) Cs-137 results at low, with multiple negative results - indicating a data quality issue. 2) Ac-228 and K-40 results have low variability, but Bi-214 has very low variability	K-40 FSS has a different slope than other radionuclides (FSS includes negative values) and slope breaks indicating multiple populations.	1	1) Gamma static data had low variability (5012-5630 cpm) and was not consistent with scan data (3540-7920 cpm)	Consistent	1) Large variability in Ac-228 but low variability in Bi-214 and K-40 FSS results	1	J. Cunningham	N/A	1	1) FSS bias samples 22 and 23 were counted greater than 30 days after sample collection.	1	1) Gamma static and scan date and time were not provided in the SUPR	1) Significant data quality problem, indicated by the following: 1) Multiple Cs-137 results at or below ND.	
TU205	2	1) Cs-137 results at low, with multiple negative results - indicating a data quality issue. 2) Ac-228 and K-40 results have low variability, but Bi-214 has very low variability	1) K-40 FSS has a different slope than other radionuclides (FSS includes negative values). 2) Ac-228, Bi-214, and K-40 plots show slope breaks indicating multiple populations.	1	1) Gamma static survey date and time not provided in the SUPR. 2) Scan data (2960-7660 cpm) is not consistent with static data (4206-4557 cpm). Scan range low values are below MDC for gamma detection.	Consistent except for Ac-228 (0.011 v 0.11 pCi/g) and Bi-214 (0.0042 v 0.1 pCi/g) results. Offsite results are consistent with sample 18.	1) Bi-214, Ac-228, and K-40 FSS results for sample 18 low compared to the rest of Parcel C. 2) K-5 tests for data for Ac-228, Pb-213, Bi-214, K-40.	1	R. Roberson	N/A	1	1) Ac-228 and Bi-214 FSS results low compared to rest of Parcel C. 2) K-5 tests for data for Ac-228, Pb-213, Bi-214, K-40.	1	1) Gamma static survey date and time not provided in the SUPR	1) Data Eval Form states that the FSS results reported a lower average activity than the rest of Parcel C, and TU205 is located in the area surrounding Drydock #4 and is consistent with the results reported for other trenches in this area of Parcel C. The Data Eval Form also states that the K-5 test flags were likely caused by low NORM activities in the area around Drydock #4. 2) Resample due to low variability and inconsistent gamma scan data, extremely low variability Bi-214 data, and evidence of multiple populations.	1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.
TU206	2	1) Cs-137 results at low, with multiple negative results - indicating a data quality issue. 2) Ac-228 and K-40 results have low variability, but Bi-214 has very low variability	1) FSS K-40 results indicate at least two populations. 2) Ac-228 and Bi-214 data set included some negative results.	1	1) Gamma static survey date and time not provided in the SUPR. 2) Scan data (2504-7800 cpm) is not consistent with static data (4206-4557 cpm)	Consistent with the exception of ND values for Ac-228 and Bi-214	1) Bi-214 sample 9 and Ac-228 in sample 3 reported low compared to Parcel C data. K-40 in samples 7 and 8 reported low compared to sample 17.	1	R. Roberson	N/A	1	1) ND outliers for Ac-228 and Bi-214, and high outliers for K-40 in FSS results.	1	1) Gamma static survey date and time were not provided in the SUPR	1) Data Eval Form states that the FSS results reported a lower average activity than the rest of Parcel C, and TU206 is located in the area surrounding Drydock #4 and is consistent with the results reported for other trenches in this area of Parcel C. The Data Eval Form also states that the K-5 test flags were likely caused by low NORM activities in the area around Drydock #4. 2) Resample due to low variability and inconsistent gamma scan data, extremely low variability Bi-214 data, and evidence of multiple populations.	1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.
TU207	2	1) Cs-137 results at low, with multiple negative results - indicating a data quality issue. 2) Ac-228 and K-40 results have low variability, but Bi-214 has very low variability	1) FSS K-40 results indicate at least two populations and large variability. 2) Ac-228 and Bi-214 FSS data set included some negative results, but indicate potential multiple distributions of data.	1	1) Gamma static survey date and time not provided in the SUPR. 2) Scan data (3160-7780 cpm) is not consistent with static data (4972-5265 cpm)	1) Data is inconsistent, variation noted in Ac-228 and Bi-214 being generally higher with off-site lab. Data Eval Form states this is likely due to on-site lab methods used for estimators. K-40 results consistent.	1) Bi-214 sample 4 and Ac-228 in sample 4 and 1 reported activities near or below ND.	1	R. Roberson	N/A	1	1) ND outliers and high outliers for Ac-228 and Bi-214, and highly variable results, potentially multiple populations for Ac-228 and Bi-214 FSS results.	1	1) Gamma static survey date and time not provided in the SUPR	1) Data Eval Form states that the FSS results reported a lower average activity than the rest of parcel C, and TU207 is located in the area surrounding Drydock #4 and is consistent with the results reported for other trenches in this area of Parcel C. 2) FSS samples 4 and 1 reported lower results than the rest of TU207 based on the on-site lab results but off-site lab results were consistent. 3) Resample due to low variability and inconsistent gamma scan data, low variability Bi-214 data, and evidence of multiple populations.	1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.
TU208	2	1) Cs-137 results at low, with multiple negative results - indicating a data quality issue. 2) Ac-228 and K-40 results have low variability, but Bi-214 has very low variability	1) FSS K-40 results indicate at least two populations and large variability. 2) Ac-228 and Bi-214 FSS data set included some negative results, but indicate potential multiple distributions of data.	1	1) Gamma static survey date and time not provided in the SUPR. 2) Scan data (2960-7550 cpm) is not consistent with static data (5624-6638 cpm)	1) Generally consistent except for Ac-228 in samples 2 and 51 which had low results in the on-site lab but not in the off-site lab, and Bi-214 which was reported low in the on-site lab results but not in the off-site lab results.	1) Bi-214 sample 2 and Ac-228 in sample 2 reported near or below ND. The K-40 data range spans from 1.03 through 18.1 cpm.	1	J. Cunningham	N/A	1	1) ND outliers and high outliers for Ac-228 and Bi-214, and highly variable results, potentially multiple populations for Ac-228 and Bi-214 FSS results. 2) Low variability and inconsistent gamma scan survey.	1	1) No gamma static data or time in SUPR. 2) Sampler is not listed in the SUPR	1) Data Eval Form states that the FSS results reported a lower average activity than the rest of parcel C, and TU208 is located in the area surrounding Drydock #4 and is consistent with the results reported for other trenches in this area of Parcel C. 3) Resample due to low variability and inconsistent gamma scan data and evidence of multiple populations.	1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.
TU209	2	1) Cs-137 results at low, with multiple negative results - indicating a data quality issue. 2) Ac-228 and K-40 results have low variability, but Bi-214 has very low variability	1) FSS K-40 results indicate at least two populations and large variability. 2) Ac-228 and Bi-214 FSS data set included some negative results, but indicate potential multiple distributions of data.	1	1) Gamma static survey date and time not provided in the SUPR. 2) Scan data (2960-7550 cpm) is not consistent with static data (5624-6638 cpm)	1) Generally consistent except for Ac-228 in samples 2 and 51 which had low results in the on-site lab but not in the off-site lab, and Bi-214 which was reported low in the on-site lab results but not in the off-site lab results.	1) Bi-214 sample 2 and Ac-228 in sample 2 reported near or below ND. The K-40 data range spans from 1.03 through 18.1 cpm.	1	A. Smith	N/A	1	1) ND outliers and large variability/potential multiple populations for Ac-228, Bi-214, K-40 FSS results.	1	1) Sampler is not listed in the SUPR.	1) Resample due to extremely low variability Bi-214 samples, evidence of multiple populations, K-5 test results, and data quality issues.	1) Navy should provide evidence that soils near drydock #4 contain NORM. Additionally it is requested that the Navy explain how the presence of NORM would cause Ac-228 and Bi-214 to be highly variable and low or ND.
TU211	2	1) K-40 results large range of values	1) Slope breaks in Ac-228 and K-40 indicate multiple populations.	1	1) Scan data (2940-7980) inconsistent with static data (5332-6025, low variability in static data; Low values of gamma scan data appear to be below the Minimum Detectable Activity (MDA)).	Consistent	1) ND outliers and large variability/potential multiple populations for Ac-228, K-40 FSS results.	1	A. Smith	N/A	1	1) ND outliers and large variability/potential multiple populations for Ac-228, K-40 FSS results.	1	1) Sampler is not listed in the SUPR	1) The sewer line was connected to radiologically impacted Building 241. 2) Resample due to low variability and inconsistent gamma scan data, evidence of multiple populations.	
TU212	0	1) K-40 results large range of values. 2) Very low variability Bi-214 results	1) K-40 results large range of values and plot has slope breaks indicating multiple populations.	1	1) Scan data (2940-7980) inconsistent with static data (5332-6025, low variability in static data; Low values of gamma scan data appear to be below the Minimum Detectable Activity (MDA)).	Consistent	1) ND outliers and large variability/potential multiple populations for Ac-228, K-40 FSS results.	1	J. Cunningham	N/A	0	1) Ac-228, Bi-214 results have a lower average activity than other samples from Parcel C.	1	1) Sampler is not listed in the SUPR	1) The sewer line was connected to radiologically impacted Building 241.	
TU219	2	1) Ac-228 and Bi-214 show average activity is lower for FSS compared with the bias samples. 2) K-40 FSS results have low range of values	1) Ac-228, Bi-214, and K-40 plots have slope breaks indicating multiple populations.	2	1) Scan (3820-6580 cpm) and static measurements (5782-6259) are not consistent.	Consistent	1) Bi-214 sample 1 and Ac-228 in sample 1 reported low compared to most of Parcel C. 2) K-40 results lower and more variable than most of the data reported for Parcel C. 3) Low variability and inconsistent gamma static survey.	1	J. Cunningham	N/A	1	1) K-40 results lower and more variable than most of the data reported for Parcel C. 3) Low variability and inconsistent gamma static survey.	1	1) Sampler is not listed in the SUPR	1) Analytical results for marshall sediment indicated activity above the release criterion for Cs-137 at 0.2445 pCi/g.	
TU220	2	1) Several Bi-214, Ac-228, K-40 FSS results, and all Cs-137 results reported as negative/ND. 2) K-40 results very small range of values, but Bi-214 FSS results have extremely low variability and range of values	1) Bi-214 results, 3 Ac-228, 1 K-40 result, and all Cs-137 results reported as negative/ND. 2) K-40 results lower activities, and slope breaks indicate multiple populations.	1	1) Scan (3500-7900 cpm) and static measurements (4031-5036) are not consistent.	1) Average Bi-228 values reported by on-site lab are higher than those reported by off-site lab, however the difference in mean values is not statistically significant.	1) K-40 results lower activities, and slope breaks indicate multiple populations.	1	J. Cunningham	N/A	1	1) K-40 results lower and more variable than most of the data reported for Parcel C. K-5 test failed for 3-40 results. 4) Gamma statics had low variability and were inconsistent with the gamma scan data.	1	1) Sampler is not listed in the SUPR	1) Resample due to extremely low variability Bi-214 samples, low range for K-40 FSS results that were inconsistent with the rest of Parcel C. Low variability and inconsistent gamma scan data, and evidence of multiple populations.	
TU221	2	1) K-40 results large range of values	1) Slope breaks in Ac-228 and K-40 indicate multiple populations.	1	1) Scan data (2940-7980) inconsistent with static data (5332-6025, low variability in static data; Low values of gamma scan data appear to be below the Minimum Detectable Activity (MDA)).	Consistent	1) ND outliers and large variability/potential multiple populations for Ac-228, K-40 FSS results.	1	J. Cunningham	N/A	1	1) K-40 results lower and more variable than most of the data reported for Parcel C. K-5 test failed for 3-40 results. 4) Gamma statics had low variability and were inconsistent with the gamma scan data.	1	1) Sampler is not listed in the SUPR	1) Analytical results from marshall sediment indicated activity above the release criterion for Cs-137 at 0.364 pCi/g, resulting in elevation of data samples from the bottom of the trench. 2) Resample due to low variability and inconsistent gamma scan data, low variability Bi-214 FSS samples, and evidence of multiple populations.	
TU226	2	1) Bi-214 FSS results have low variability	1) Bi-214 FSS results have low variability	1	1) Scan data (3320-7980 cpm) is not consistent with static data (5017-5601 cpm)	Consistent	1) Bi-214 has low variability, slope breaks on Ac-228, Bi-214, and K-40 Q2 plots may indicate more than one population. 2) Low variability and inconsistent gamma static survey	1	R. Roberson	N/A	1	1) Bi-214 has low variability, slope breaks on Ac-228, Bi-214, and K-40 Q2 plots may indicate more than one population. 2) Low variability and inconsistent gamma static survey	1	1) Sampler is not listed in the SUPR	1) The TU226 sewer line is connected to downstream of radiologically impacted Building 277.	
TU227	2	1) Bi-214 and K-40 results have extremely low variability	1) Bi-214 and K-40 plots have slope breaks indicating multiple populations.	1	1) Scan data collection started concurrently with FSS sample collection. 2) Scan data (5970-7890 cpm) are not consistent with static data (5897-8320 cpm)	Form notes, "Data is consistent, except for sample 16. Onsite K-40 activity is 1.21 pCi/g and offsite activity is 0.199 pCi/g"	1) Form notes for K-40, "Final Systematic samples display less variability between the Pb-213 results than the rest of Parcel C."	1	A. Smith	N/A	1	1) Gamma static survey had low variability and was inconsistent with gamma scan data	1	1) Names of samplers/runners not provided in SUPR.	1) Resample due to low variability and inconsistent gamma static survey, extremely low variability Bi-214 and K-40 FSS data, and evidence of multiple populations.	
TU231	2	1) Bi-214 and K-40 data have low variability	1) Bi-214 and K-40 plots have slope breaks indicating multiple populations.	1	1) Scan data collection started concurrently with FSS sample collection. 2) Scan data (3940-7810 cpm) are not consistent with static data (4926-5792 cpm)	Consistent	1) Gamma static survey had low variability and was inconsistent with gamma scan data	1	J. Cunningham	N/A	1	1) Gamma static survey had low variability and was inconsistent with gamma scan data	1	1) Names of samplers/runners not provided in SUPR.	1) Resample due to low variability and inconsistent gamma static survey, low variability Bi-214 and K-40 FSS data, and evidence of multiple populations.	
TU232	2	1) Bi-214 data have low variability. 2) K-40 FSS results large range of values	1) Ac-228, Bi-214, and K-40 plots have slope breaks indicating multiple populations.	1	1) Date and time of static survey not provided in SUPR.	Consistent	1) Scan survey started concurrently with the time of collection of FSS sample 1.	1	J. Cunningham	N/A	1	1) Low variability and inconsistent gamma static survey data.	1	1) Names of samplers/runners not provided in SUPR.	1) Analytical results for marshall sediment identified Bi-226 activity above the release criterion of 2.47 pCi/g, resulting in elevation of data samples from the trench bottom. 2) Resample due to low variability and inconsistent gamma static survey, conducting gamma scan survey before FSS sample collection, inconsistent K-40 data, low variability Bi-214 data, and evidence of multiple populations.	
TU233	2	1) Several Bi-214 and Ac-228 results, and all Cs-137 results reported as negative/ND. 2) Bi-214 FSS data have low variability, but K-40 data have high variability	1) Ac-228, Bi-214, and K-40 plots have slope breaks indicating multiple populations.	1	1) Date and time of static survey not provided in SUPR.	Consistent	1) Several Bi-214, Ac-228, & K-40 FSS results reported as negative/ND.	1	R. Roberson	N/A	1	1) Low variability and inconsistent gamma static survey.	1	1) Date and time of static survey not provided in SUPR.	1) Biased samples collected on 11/13/2021; systematic samples collected two months later, on 01/30/2022. 2) Analytical results from marshall sediment showed Cs-137 activity above the release criterion in two of the samples (0.345 and 0.382 pCi/g). A sediment sample was collected from pipe excavated to a soil and was found to be below the release criterion. 3) Resample due to low variability and inconsistent gamma scan data, low variability Bi-214 data, and evidence of multiple populations.	
TU236	2	Very low variability Bi-214	Slope breaks in Ac-228 and K-40 plots indicate multiple populations.	1	1. Form notes for gamma statics, "Gamma static dataset has low variability compared with gamma scan dataset with a range of 1236-5497 cpm. Gamma static dataset is inconsistent with gamma scan dataset and soil samples results." 2. Form notes for gamma scan, "Gamma scan dataset is inconsistent with scan data with a range of 3660-8028 cpm."	Form notes for Bi-214, Ac-228, and K-40. "Final Systematic samples display different characteristics from the rest of Parcel C."	1	R. Roberson	N/A	1	1. FSS samples have different characteristics than the bias samples (which were collected because Cs-137 was detected in 1 month). 2. Low variability gamma static data that is inconsistent with the gamma scan data. 3. Low variability Bi-214 data.	1	No survey/sampler name in SUPR.	Resample due to FSS samples with different characteristics than bias samples and multiple populations; low variability gamma static data that is inconsistent with the gamma scan data, and low variability in Bi-214 data.		
TU244	0		Slope breaks in Ac-228 and K-40, and probably in Bi-214 plots indicate multiple populations. Form notes, "Ac-228 quantile plot shows a band, indicating multiple distributions."	1	No gamma static data or time in SUPR	Form notes for Bi-214, Ac-228, and K-40. "Final Systematic samples indicate the potential for at least two different data populations."	1	R. Roberson	N/A	1	Multiple populations in Bi-214, Ac-228, and K-40 may indicate falsification.	1	No survey/sampler name in SUPR and no gamma static data or time in SUPR	1. Form notes also observe "TU247 had a significantly high mean for K-40 when compared to rest of Parcel C and had a p-value of 2.6E-417 and that "evidence of potential data falsification was identified in the gamma static measurements." 2. Resample due to inconsistent gamma statics, low variability Bi-214, and slope breaks and high mean K-40, potentially indicating a different source for some samples.		
TU247	2	Low variability Bi-214. Form notes, "sample variance is low for Bi-214, & 4-40 average is higher than the rest of Parcel C."	Slope breaks on Bi-214 and K-40 plots.	1	1. Form notes for gamma statics, "The static measurements reported low variability. Gamma static dataset inconsistent with the gamma scan dataset and Final Systematic sample dataset." 2. Form notes for gamma scan, "Gamma scan dataset consistent with Final Systematic sample dataset and inconsistent with the gamma static dataset."	Form notes, "The onsite and offsite lab generally agree."	1	J. Cunningham	N/A	1	1. Gamma statics inconsistent with gamma scan and FSS samples.	1	No date or time recorded for static survey in SUPR and no sampler/runners name in SUPR.	1. Form also observes "TU247 had a significantly high mean for K-40 when compared to rest of Parcel C and had a p-value of 2.6E-417 and that "evidence of potential data falsification was identified in the gamma static measurements." 2. Resample due to inconsistent gamma statics, low variability Bi-214, and slope breaks and high mean K-40, potentially indicating a different source for some samples.		
TU302	2	Characterization samples for Ac-228, Bi-214, K-40, and Cs-137 results are different from the FSS samples, which the Cs-137 characterization sample have a slightly lower mean and greater variability than the FSS samples. Form notes, "Characterization results show lower average and lower variability compared to Final Systematic data."	Form notes for Bi-214, Ac-228, and K-40. "Final Systematic samples display different characteristics from the rest of Parcel C."	2	Form notes for gamma statics, "Gamma static results have low variability with an average at the upper bound of the range of gamma scan results. The gamma static dataset is inconsistent with the gamma scan dataset and Final Systematic sample dataset." Form notes for gamma scan, "Gamma scan dataset is inconsistent with static data and consistent with FSS sample dataset." Also form notes, "evidence of potential data falsification was identified in the gamma static measurements."	Form notes for Bi-214, Ac-228, and K-40. "Final Systematic samples display different characteristics from the rest of Parcel C."	1	R. Roberson and J. Cunningham	N/A	1	1. FSS samples counted over 5 days, 13 months after final bias/characterization samples counted. 2. Inconsistent gamma statics and gamma scan (which is consistent with each other and with the post-reconstruction FSS samples). 3. Evidence of different populations in FSS and bias/characterization samples.	1	FSS samples counted over 5 days, 13 months after final bias/characterization samples counted. 2. Inconsistent gamma statics and gamma scan (which is consistent with each other and with the post-reconstruction FSS samples). 3. Evidence of different populations in FSS and bias/characterization samples.	1	FSS samples counted over 5 days, 13 months after final bias/characterization samples counted. 2. Inconsistent gamma statics and gamma scan (which is consistent with	

TU133	2	Form notes, "Final Systematic Ac-228 and Bi-214 Data Plots show lower average activity compared with Bias Ac-228 and Bi-214 results."	Slope breaks in Ac-228, Bi-214, K-40 indicate multiple populations. Form notes, "Quantile plots show the median activity for Ac-228 and Bi-214 are higher for Bias samples compared with Final Systematic samples."	2	Form notes for gamma statics, "Measurements are relatively high compared to other trenches in Parcel C, consistent with higher average radionuclide concentrations identified in soil samples. Subsets 155 of 18 static measurements exceeded the scan investigation level for the instrument. The highest static measurement was for sample 18. No static readings were provided for bias sample locations. Biased samples were selected based on the results of the gamma scan survey conducted the same day the Final Systematic samples were collected. The first round of bias samples was collected a week after the Final Systematic samples. The gamma survey associates elevated readings with samples 19, 20 and 21, however there are no measurements recorded for those locations in the static surveys and samples weren't collected for a week after those measurements were made. Clearing of two of those locations occurred sometime after that and were resampled 74 days after the biased samples were collected. The gamma scan dataset in the draft SUPR doesn't reflect any resurvey and sample dates of the confirmation samples. The draft SUPR does not discuss resampling systematic locations after additional remediation was performed." For gamma scan, the form notes, "Section 3 states the highest scan count rates were associated with samples 19, 20 and 21, however 16 static measurements exceeded the scan investigation level."	Form notes, "Bi-212 doesn't correlate very well, otherwise onsite and offsite results are generally consistent."	0		B. Willett	1	F55 samples collected over 3 days. Form states, "F55 samples were collected on 08/02/2013. Additional samples were collected on 08/09/2013 and 10/24/2013." It appears these were bias samples due to gamma scan exceedances. However, there should have been a 2nd set of 18 F55 samples collected, which does not appear to have been done.	1	1. No date or time recorded for static survey in SUPR and no samples/runner name in SUPR. 2. Second set of F55 samples (required after remediation due to elevated gamma scan and bias samples) was not collected.	1. Resample due to uncertainty and failure to collect a full set of 18 F55 samples after remediation, lack of required gamma static measurements, and evidence of multiple populations. 2. One bias sample analyzed by off-site lab after 21-day ingrowth exceeded clearing criterion for Ra-226, but was not excavated due to application of the background area for NORM. 3. K-40 test failed for multiple radionuclides. Form observes, "TU1333 had a significantly high mean for Ac-228 compared to the rest of parcel C and had a p-value of 1.09e-14. TU1333 had a significantly high mean for Bi-214 compared to the rest of parcel C and had a p-value of 4.25e-8. TU1333 had a significantly high mean for Pb-212 compared to the rest of parcel C and had a p-value of 1.07e-32. TU1333 had a significantly high mean for Pb-214 compared to the rest of parcel C and had a p-value of 1.31e-14. TU1333 had a significantly high mean for Ra-226 compared to the rest of parcel C and had a p-value of 3.88e-14. TU1333 had a significantly high mean for Ra-226 compared to the rest of parcel C and had a p-value of 6.36e-8."	
TU137	2	Very low variability K-40 F55 data. Bias samples had lower variability than F55 samples for Ac-228 and Bi-214, but higher variability than K-40 F55 samples. This suggests that bias samples are a different population than the F55 samples.	Slope breaks in Ac-228, Bi-214, and K-40 plots indicate multiple populations. Form notes, "K-40 final systematic plot is closer to horizontal than the bias plot, indicating less variability in the final systematic data."	1	Gamma scan and gamma statics were collected prior to F55 sample collection, suggesting potential to bias samples to areas with low readings. Form notes for gamma scan, "Gamma scan results range from 3,640 to 8,420 cpm, exceeding the investigation level of 6,150 cpm at sample location 28." Form notes for gamma statics, "Gamma static results ranged from 3,565 to 7,166 cpm, with the maximum reading at sample location 28." This location had the highest K-40 measurement, but it is unclear if the maximum gamma static measurement is really consistent with the gamma scan maximum.	Form notes for Bi-214 and Ac-228, "Final Systematic samples indicate the potential for at least two different data populations."	0		C. Bradford	1	Very low variability K-40 data appears to be inconsistent with F55 data. This was a sign of potential falsification in 2012.	1	F55 samples collected after gamma scan and gamma static surveys.	1. Resample due to uncertainty and potential that F55 samples were mostly biased to areas with low readings, low variability K-40 data, K-5 test failures, and evidence of multiple populations. 2. Cs-137 detected in manhole sediment at 0.1999 µCi/g. Ra-226 detected in one pipe segment at 5.940 µCi/g. One pipe section swipe sample had elevated levels beta/gamma contamination levels, recorded at a maximum of 1,185 disintegrations per minute per 100 square centimeters. As a result, the manhole and pipe section were disposed of as low-level radioactive waste. Biased samples were collected from the bottom of the trench in response to these detections. 3. Form notes in conclusion, "TU1337 consists of soils with multiple radionuclide distributions, with Ac-228 providing graphical evidence of at least two distributions. This is consistent with observations from adjacent trenches in Parcel C and confirms the presence of multiple soil types being used as fill in this area of HPNS." However, there is no supporting evidence that this is the case.	
TU138	2	Very low variability K-40 and Bi-214 F55 data.	Slope breaks in Ac-228, Bi-214, and K-40 plots indicate multiple populations.	1	Form notes for gamma statics, "Gamma static results ranged from 3,399 to 5,206 cpm, with the highest reading recorded for sample location 14." Form notes for gamma scan, "The gamma scan results ranged from 3,830 to 10,900 cpm, exceeding the action level of 6,150 cpm at sample location 14." The gamma scan maximum is 1,700 cpm higher than the gamma static maximum, which does not appear to be consistent. However, this point was sampled.	Form notes for Bi-214 and Ac-228, "Final Systematic samples indicate the potential for at least two different data populations."	0		B. Willett	1	Samples were not counted within 2 days of collection (10/17/13) and were counted on three different days, indicating the potential for substitution. Form notes, "Samples were counted Friday 10/18/2013, Monday 10/21/2013, and Tuesday 10/22/2013."	1	No date or time recorded for static survey in SUPR and no samples/runner name in SUPR.	1. Resample (and scan) due to failure to remediate point 14 where off-site lab sample had higher Ra-226/Bi-214 results than the onsite lab (failure to meet ROD requirements), very low variability Bi-214 and K-40 data, analysis of samples on 3 different days allowing for potential substitution, and evidence of multiple populations. 2. There is no evidence that remediation of elevated sample point 14 occurred or that a second set of F55 samples were collected following remediation of this point. Form notes, "Sample 14 exceeded the Ra-226 release criterion with a reported concentration of 1.490 µCi/g. Sample 14 was allowed to reach secular equilibrium between Ra-226 and Bi-214 and was re-counted in an off-site laboratory. The reported concentration of Ra-226 following ingrowth was 1.632 µCi/g, again exceeding the release criterion." In the conclusion, the Navy wrote this off as a small area of fill with elevated activity, but this does not meet the ROD requirements.	
TU139	2	Low variability Bi-214 data.	Slope breaks in Ac-228, Bi-214, and K-40 data plots, indicating multiple populations. Form notes, "Ac-228 and Bi-214 Quantile plots have bends, indicating the potential for multiple distributions."	1		Form notes for Bi-214 and Ac-228, "Final Systematic samples indicate the potential for at least two different data populations."	0		G. Winder	0		1	1. Static survey date and time not included in SUPR. 2. 15 feet of pipe not removed.	1. Re-excavate and resample, remove the 15 feet of pipe that was not excavated and sample the trench area where this pipe segment is removed. Resampling needed due to low variability Bi-214 data and evidence of multiple populations. 2. Form notes, "15 linear feet of pipe associated with trench segment 12-C11-00-20 was not removed in order to facilitate Parcel C swale construction activities," which appears to not be in compliance with the ROD.	

Fill Units (Overburden Unit or Excavated Soil Unit)	Associated Trench Unit	Navy Recommends confirmation sampling of the FU (0=no; 2=yes) 1 = reanalyze archived sample	Navy Recommends TU Confirmation Sampling	Reg Agencies Recommend TU Confirmation Sampling	Confirmation Sampling Recommended	Navy recommends resampling FU that went into this TU, therefore, all FUs that went into this TU must be resampled. (OB072, OB196)	Comments
ES300	TU197	2	2		2		
ES301		2			2		
ES302		2			2		
ES303	TU196	2	2		2		
ES307	TU199	0	0	2	2		
ES308	TU208	2	0	2	2		
ES309	TU209	0	0	2	2		
ES311	TU207	2	0	2	2		
ES312	TU206	2	0	2	2		
ES314	TU199	2	0	2	2		
ES317	TU205	2	0	2	2		
ES318	TU196	2	2		2		
ES321	TU209	2	0	2	2		
ES322	TU196	2	2		2		
ES324	TU209	2	0	2	2		
ES325	TU198	2	1	2	2		S0009/no
ES327	TU198	0	1	2	2		
ES329	TU198	2	1	2	2		
ES332	TU219	0	0	2	2		
ES333	TU219	2	0	2	2		
ES334	TU200	0	0	2	2		
ES336	TU212	2	0	2	2		
ES337	TU198	2	1	2	2		
ES338	TU198	2	1	2	2		
ES339	TU212	0	0	0	0		
ES340		2			2		
ES341		2			2		
ES342		2			2		
ES343	TU207	0	0	2	2		
ES375	TU194	2	1	2	2	Navy recommends reanalyzing archived sample only	S0001
ES378	TU191	2	1	2	2	Navy recommends reanalyzing archived sample only	
ES380	TU191	2	1	2	2	Navy recommends reanalyzing archived sample only	120 fill units and 69 TUs
ES381	TU191	2	1	2	2	Navy recommends reanalyzing archived sample only	
ES382	TU191	0	1	2	2	Navy recommends reanalyzing archived sample only	
ES383	TU194	0	1	2	2	Navy recommends reanalyzing archived sample only	
ES385	TU195	0	2		2		
ES390	TU195	0	2		2		
ES392	TU195	0	2		2		TU244 had imported fill only. No ES
ES421	TU200	2	0	2	2		TU325 had imported fill only. No ES
ES436		2			2		TU327 had imported fill only. No ES
ES437		2			2		S0001 - soil was excavated but no fill was used to replace it
ES438		2			2		S0002 - no soil excavated so no fill required
ES439	TU200	2	0	2	2		TU192 - Unknown fill units
ES440	TU203	0	2		2		

Summary of EPA/DTSC/CDPH reviews

Total units recommended for resampling by Navy and EPA/DTSC/CDPH

# of units	% of units	
65	94%	Trench Units, excluding North Pier
116	97%	Fill Units
9	82%	North Pier Survey Units
190	91%	Total

Navy and EPA reviews of Parcel C Trench Units

Navy reviewed all Trench Units to look for signs of potential falsification		
69	100%	Total trench units, excluding North Pier
28	41%	Navy recommended confirmation sampling due to signs of potential falsification
4	6%	Navy recommended reanalysis of archived samples
37	54%	Navy recommended NFA = No further action due to signs of falsification,
EPA reviewed the Trench Units recommended for NFA		
4	6%	EPA score 0 = No specific findings of particular concern
0	0%	EPA Score 1 = Need further review
33	48%	EPA Score 2 = Need resampling before determination that the record supports ROD requirements met
Total Navy and EPA recommend for resampling Trench Units or reanalysis of archived samples		
65	94%	

Navy and DTSC reviews of Parcel C Fill Units

Navy reviewed all Fill Units to look for signs of potential falsification		
120	100%	Total fill units
94	78%	Navy recommended confirmation sampling due to signs of potential falsification
0	0%	Navy recommended reanalysis of archived samples
26	22%	Navy recommended NFA = No further action due to signs of falsification
DTSC reviewed the Fill Units recommended for NFA		
4	3%	DTSC score 0 = No specific findings of particular concern
0	0%	DTSC Score 1 = Need further review
22	18%	DTSC Score 2 = Need resampling before determination that the record supports ROD requirements met
Total Navy and DTSC recommend for resampling Trench Units or reanalysis of archived samples		
116	97%	

Navy and CDPH reviews of North Pier Units

Navy reviewed all North Pier Survey Units to look for signs of potential falsification		
11	100%	Total fill units
8	73%	Navy recommended confirmation sampling due to signs of potential falsification
0	0%	Navy recommended reanalysis of archived samples
3	27%	Navy recommended NFA = No further action due to signs of falsification
DTSC reviewed the Fill Units recommended for NFA		
2	18%	CDPH score 0 = No specific findings of particular concern
0	0%	CDPH Score 1 = Need further review
1	9%	CDPH Score 2 = Need resampling before determination that the record supports ROD requirements met
Total Navy and DTSC recommend for resampling Trench Units or reanalysis of archived samples		
9	82%	

Summary of EPA Reviews of Trench Units from Spreadsheet #1

Trench Unit	EPA Score
TU193	2
TU199	2
TU200	2
TU205	2
TU206	2
TU207	2
TU208	2
TU209	2
TU211	2
TU212	0
TU219	2
TU220	2
TU221	2
TU226	2
TU227	2
TU231	2
TU232	2
TU233	2
TU236	2
TU244	0
TU247	2
TU302	2
TU315	2
TU317	2
TU320	2
TU321	2
TU322	2
TU324	2
TU325	0
TU327	0
TU328	2
TU331	2
TU332	2
TU333	2
TU337	2
TU338	2
TU339	2